

[illegible]

```
RRRRRRRR  DDDDDDDD  BBBB8888  DDDDDDDD  IIIIII  SSSSSSSS  PPPPPPPP
RRRRRRRR  DDDDDDDD  BBBB8888  DDDDDDDD  IIIIII  SSSSSSSS  PPPPPPPP
RR      RR  DD      DD  BB      BB  DD      DD  II      II  SS      SS  PP      PP
RR      RR  DD      DD  BB      BB  DD      DD  II      II  SS      SS  PP      PP
RR      RR  DD      DD  BB      BB  DD      DD  II      II  SS      SS  PP      PP
RRRRRRRR  DD      DD  BBBB8888  DD      DD  II      II  SSSSSS  PPPPPPPP
RRRRRRRR  DD      DD  BBBB8888  DD      DD  II      II  SSSSSS  PPPPPPPP
RR      RR  DD      DD  BB      BB  DD      DD  II      II  SS      SS  PP
RR      RR  DD      DD  BB      BB  DD      DD  II      II  SS      SS  PP
RR      RR  DD      DD  BB      BB  DD      DD  II      II  SS      SS  PP
RR      RR  DDDDDDDD  BBBB8888  DDDDDDDD  IIIIII  SSSSSSSS  PP
RR      RR  DDDDDDDD  BBBB8888  DDDDDDDD  IIIIII  SSSSSSSS  PP
                                     ....
                                     ....
                                     ....
                                     ....
```

```
LL      IIIIII  SSSSSSSS
LL      IIIIII  SSSSSSSS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SSSSSS
LL      II      SSSSSS
LL      II      SS
LL      II      SS
LL      II      SS
LL      II      SS
LLLLLLLLLL  IIIIII  SSSSSSSS
LLLLLLLLLL  IIIIII  SSSSSSSS
```

(2)	113	Declarations and Equates
(3)	175	Transfer Vector and Service Definitions
(4)	227	Change Mode Dispatcher Vector Block
(5)	275	Executive Mode Dispatcher
(6)	329	Rundown Handler


```
0000 1 .TITLE RDBDISP - Rights database system service dispatcher
0000 2 .IDENT 'V04-000'
0000 3
0000 4 *****
0000 5
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0000 23
0000 24 *****
0000 25
0000 26
0000 27
0000 28 Facility: Rights database (RDB) System Services
0000 29 ++
0000 30 Abstract:
0000 31 This module contains the dispatcher for the rights database
0000 32 loadable system services. These system services are implemented
0000 33 in a privileged shareable image. The remaining rights database
0000 34 system services are in the exec.
0000 35
0000 36 Overview:
0000 37 The rights database system services are contained in a privileged
0000 38 shareable image that is linked into user program images in exactly the
0000 39 same fashion as any shareable image. The creation and installation of
0000 40 a privileged, shareable image is slightly different from that of an
0000 41 ordinary shareable image. These differences are:
0000 42
0000 43 1. A vector defining the entry points and providing other
0000 44 control information to the image activator. This vector
0000 45 is a the lowest address in an image section with the VEC
0000 46 attribute.
0000 47
0000 48 2. The shareable image is linked with the /PROTECT option
0000 49 that marks all of the image sections so that they will
0000 50 protected and given EXEC mode ownership by the image
0000 51 activator.
0000 52
0000 53 3. The shareable image MUST be installed /SHARE /PROTECT
0000 54 with the INSTALL utility in order for the image activator
0000 55 to connect the privileged shareable image to the change mode
0000 56 dispatchers.
0000 57
```

```
0000 58 : A privileged shareable image implementing user written system services
0000 59 : is comprised of the following major components:
0000 60 :
0000 61 : 1. A transfer vector containing all of the entry points and
0000 62 : collecting them at the lowest virtual address in the shareable
0000 63 : image. This formalism enables revision of the shareable
0000 64 : image without necessitating the relinking of images that
0000 65 : use it.
0000 66 :
0000 67 : 2. A Privileged Library Vector in a PSECT with the VEC attribute
0000 68 : that describes the entry points for dispatching EXEC and
0000 69 : KERNEL mode services along with validation information.
0000 70 :
0000 71 : 3. A dispatcher for kernel mode services. This code will
0000 72 : be called by the VMS change mode dispatcher when it
0000 73 : fails to recognize a kernel mode service request.
0000 74 :
0000 75 : 4. A dispatcher for executive mode services. This code will
0000 76 : be called by the VMS change mode dispatcher when it fails
0000 77 : to recognize an executive mode service request.
0000 78 :
0000 79 : 5. Service routines to perform the various services.
0000 80 :
0000 81 : Enviornment:
0000 82 :
0000 83 : VAX/VMS operating system, installed as a privileged shareable image
0000 84 :
0000 85 : --
0000 86 :
0000 87 : Author:
0000 88 :
0000 89 : R. Scott Hanna, CREATION DATE: 17-JAN-1983
0000 90 :
0000 91 : Modified by:
0000 92 :
0000 93 : V03-005 ACG0417 Andrew C. Goldstein, 18-Apr-1984 16:35
0000 94 : Add rundown routine to dequeue ACL locks; fix minimum
0000 95 : arg count for $FORMAT_ACL and $PARSE_ACL.
0000 96 :
0000 97 : V03-004 LY0468 Larry Yetto 22-MAR-1984 14:11
0000 98 : Add two new paramaters to $MOD_IDENT for the new name
0000 99 : and new value.
0000 100 :
0000 101 : V03-003 LMP0185 L. Mark Pilant, 6-Feb-1984 12:55
0000 102 : Add a new service $CHANGE_ACL for changing the ACL on
0000 103 : random objects.
0000 104 :
0000 105 : V03-002 LMP0100 L. Mark Pilant, 14-Apr-1983 11:32
0000 106 : Add new services: $FORMAT_ACL and $PARSE_ACL.
0000 107 :
0000 108 : V03-001 RSH0009 R. Scott Hanna 09-Mar-1983
0000 109 : Changed CHME codes.
0000 110 :
0000 111 : --
```



```
0000 113 .SBTTL Declarations and Equates
0000 114 :
0000 115 : Macro Definitions
0000 116 :
0000 117 DEFINE_SERVICE - A macro to make the appropriate entries in several
0000 118 different PSECTs required to define an EXEC or KERNEL
0000 119 mode service. These include the transfer vector,
0000 120 the case table for dispatching, and a table containing
0000 121 the number of required arguments.
0000 122 :
0000 123 DEFINE_SERVICE Name,Number_of_Arguments,Mode
0000 124 :
0000 125 .MACRO DEFINE_SERVICE,NAME,NARG=0,MODE=KERNEL
0000 126 .PSECT $$$TRANSFER_VECTOR,PAGE,NOWRT,EXE,PIC,SHR
0000 127 .ALIGN QUAD ; Align entry points for speed and style
0000 128 .TRANSFER NAME ; Define name as universal symbol for entry
0000 129 .MASK NAME ; Use entry mask defined in main routine
0000 130 .IF IDN MODE,KERNEL
0000 131 CHMK #<KCODE_BASE+KERNEL_COUNTER> ; Change to kernel mode and execute
0000 132 RET ; Return
0000 133 KERNEL_COUNTER=KERNEL_COUNTER+1 ; Advance counter
0000 134 :
0000 135 .PSECT KERNEL_NARG,BYTE,NOWRT,EXE,PIC,SHR
0000 136 .BYTE NARG ; Define number of required arguments
0000 137 :
0000 138 .PSECT USER_KERNEL_DISP1,BYTE,NOWRT,EXE,PIC,SHR
0000 139 .WORD 2+NAME-KCASE_BASE ; Make entry in kernel mode CASE table
0000 140 :
0000 141 .IFF
0000 142 CHME #<ECODE_BASE+EXEC_COUNTER> ; Change to executive mode and execute
0000 143 RET ; Return
0000 144 EXEC_COUNTER=EXEC_COUNTER+1 ; Advance counter
0000 145 :
0000 146 .PSECT EXEC_NARG,BYTE,NOWRT,EXE,PIC,SHR
0000 147 .BYTE NARG ; Define number of required arguments
0000 148 :
0000 149 .PSECT USER_EXEC_DISP1,BYTE,NOWRT,EXE,PIC,SHR
0000 150 .WORD 2+NAME-ECASE_BASE ; Make entry in exec mode CASE table
0000 151 .ENDC
0000 152 .ENDM DEFINE_SERVICE
0000 153 :
0000 154 : Equated Symbols
0000 155 :
0000 156 :
0000 157 $PLVDEF ; Define PLV offsets and values
0000 158 $PRDEF ; Define processor register numbers
0000 159 :
0000 160 : Initialize counters for change mode dispatching codes
0000 161 :
00000000 0000 162 KERNEL_COUNTER=0 ; Kernel code counter
00000000 0000 163 EXEC_COUNTER=0 ; Exec code counter
0000 164 :
0000 165 :
0000 166 : Own Storage
0000 167 :
00000000 0000 168 .PSECT KERNEL_NARG,BYTE,NOWRT,EXE,PIC,SHR
0000 169 KERNEL_NARG: ; Base of byte table containing the
```

- Rights database system service ^{B 7}dispatc 16-SEP-1984 01:58:36 VAX/VMS Macro V04-00 Page 4
Declarations and Equates 5-SEP-1984 01:44:52 [LOADSS.SRC]RDBDISP.MAR;1 (2)

[illegible]


```
0000 175 .SBTTL Transfer Vector and Service Definitions
0000 176 :++
0000 177 : The use of transfer vectors to effect entry to the user written system services
0000 178 : enables some updating of the shareable image containing them without necessitating
0000 179 : a re-link of all programs that call them. The PSECT containing the transfer
0000 180 : vector will be positioned at the lowest virtual address in the shareable image
0000 181 : and so long as the transfer vector is not re-ordered, programs linked with
0000 182 : one version of the shareable image will continue to work with the next.
0000 183 :
0000 184 : Thus as additional services are added to a privileged shareable image, their
0000 185 : definitions should be added to the end of the following list to ensure that
0000 186 : programs using previous versions of it will not need to be re-linked.
0000 187 : To completely avoid relinking existing programs the size of the privileged
0000 188 : shareable image must not change so some padding will be required to provide
0000 189 : the opportunity for future growth.
0000 190 :--
0000 191
0000 192 DEFINE_SERVICE SYSSADD_HOLDER,3,EXEC ;Add Holder Record To The Rights Dat
0002 193 DEFINE_SERVICE SYSSADD_IDENT,4,EXEC ;Add Identifier To The Rights Databa
0004 194 DEFINE_SERVICE SYSSCREATE_RDB,1,EXEC ;Create The Rights Database
0006 195 DEFINE_SERVICE SYSSFIND_HELD,4,EXEC ;Find Identifiers Held By Holder
0008 196 DEFINE_SERVICE SYSSFIND_HOLDER,4,EXEC ;Find Holder Of Identifier
000A 197 DEFINE_SERVICE SYSSMOD_HOLDER,4,EXEC ;Modify Holder Record In Rights Data
000C 198 DEFINE_SERVICE SYSSMOD_IDENT,5,EXEC ;Modify Identifier Record In Rights
000E 199 DEFINE_SERVICE SYSSREM_HOLDER,2,EXEC ;Remove Holder Record From Rights Da
0010 200 DEFINE_SERVICE SYSSREM_IDENT,1,EXEC ;Remove Identifier From Rights Datab
0012 201
0012 202 : ACL manipulation services.
0012 203
0012 204 DEFINE_SERVICE SYSS$FORMAT_ACL,7,EXEC ;Convert ACE to text
0014 205 DEFINE_SERVICE SYSS$PARSE_ACL,4,EXEC ;Convert ACE to binary
0016 206 DEFINE_SERVICE SYSS$CHANGE_ACL,7,EXEC ;modify an object's ACL
0018 207
0018 208 :
0018 209 : The base values used to generate the dispatching codes should be negative for
0018 210 : user services and must be chosen to avoid overlap with any other privileged
0018 211 : shareable images that will be used concurrently. Their definition is
0018 212 : deferred to this point in the assembly to cause their use in the preceding
0018 213 : macro calls to be forward references that guarantee the size of the change
0018 214 : mode instructions to be four bytes. This satisfies an assumption that is
0018 215 : made by for services that have to wait and be retried. The PC for retrying
0018 216 : the change mode instruction that invokes the service is assumed to be 4 bytes
0018 217 : less than that saved in the change mode exception frame. Of course, the particula
0018 218 : service routine determines whether this is possible.
0018 219 :
0018 220 : The rights database system services have a block of 16 CHME codes reserved
0018 221 : (16416-16431).
0018 222 :
0018 223 :
00000000 0018 224 KCODE_BASE=0 ; No CHMK codes used
00004020 0018 225 ECODE_BASE=16416 ; Base CHME code value for these services
```



```
0018 227 .SBTTL Change Mode Dispatcher Vector Block
0018 228 :++
0018 229 : This vector is used by the image activator to connect the privileged shareable
0018 230 : image to the VMS change mode dispatcher. The offsets in the vector are self-
0018 231 : relative to enable the construction of position independent images. The system
0018 232 : version number will be used by the image activator to verify that this shareable
0018 233 : image was linked with the symbol table for the current system.
0018 234 :
0018 235 : Change Mode Vector Format
0018 236 :
0018 237 : +-----+
0018 238 : | Vector Type Code | PLV$L_TYPE
0018 239 : | (PLV$L_TYP_CM0D) |
0018 240 : +-----+
0018 241 : | System Version Number | PLV$L_VERSION
0018 242 : | (SYSSK_VERSION) |
0018 243 : +-----+
0018 244 : | Kernel Mode Dispatcher Offset | PLV$L_KERNEL
0018 245 : +-----+
0018 246 : | Exec Mode Entry Offset | PLV$L_EXEC
0018 247 : +-----+
0018 248 : | User Rundown Service Offset | PLV$L_USRUNDWN
0018 249 : +-----+
0018 250 : | Reserved |
0018 251 : +-----+
0018 252 : | RMS Dispatcher Offset | PLV$L_RMS
0018 253 : +-----+
0018 254 : | Address Check | PLV$L_CHECK
0018 255 : +-----+
0018 256 :
0018 257 :
0018 258 :
0018 259 :
0018 260 :
0018 261 :
0018 262 :
0018 263 :
00000000 264 .PSECT USER_SERVICES,PAGE,VEC,PIC,NOWRT,EXE,SHR
0000 265
00000001 0000 266 .LONG PLV$L_TYP_CM0D ; Set type of vector to change mode dispatch
00000000 0004 267 .LONG SYSSK_VERSION ; Identify system version
00000000 0008 268 .LONG 0 ; No kernel mode dispatcher
00000001 000C 269 .LONG EXEC_DISPATCH- ; Offset to executive mode dispatcher
FFFFFFFF4 0010 270 .LONG RDB_RUNDOWN- ; Rundown routine
00000000 0014 271 .LONG 0 ; Reserved
00000000 0018 272 .LONG 0 ; No RMS dispatcher
00000000 001C 273 .LONG 0 ; Address check - PIC image
```

```
0020 275 .SBTTL Executive Mode Dispatcher
0020 276 :++
0020 277 : Input Parameters:
0020 278 :
0020 279 : (SP) - Return address if bad change mode value
0020 280 :
0020 281 : RO - Change mode argument value.
0020 282 :
0020 283 : AP - Argument pointer existing when the change
0020 284 : mode instruction was executed.
0020 285 :
0020 286 : FP - Address of minimal call frame to exit
0020 287 : the change mode dispatcher and return to
0020 288 : the original mode.
0020 289 :--
00000000 290 .PSECT USER_EXEC_DISP0,BYTE,NOWRT,EXE,PIC,SHR
50 0000'8F 3C 0000 291 EACCVIO: ; Exec access violation
04 0005 292 MOVZWL #SS$_ACCVIO,RO ; Set access violation status code
0006 293 RET ; and return
50 0000'8F 3C 0006 294 EINSFARG: ; Exec insufficient arguments.
04 000B 295 MOVZWL #SS$_INSFARG,RO ; Set status code and
05 000C 296 RET ; return
000D 297 ENOTME: RSB ; RSB to forward request
000D 298
51 BFEO C0 9E 000D 299 EXEC_DISPATCH:: ; Entry to dispatcher
F8 19 0012 300 MOVAB W^=ECODE_BASE(RO),R1 ; Normalize dispatch code value
OC 51 B1 0014 301 BLSS ENOTME ; Branch if code value too low
F3 1E 0017 302 CMPW R1,#EXEC_COUNTER ; Check high limit
0019 303 BGEQU ENOTME ; Branch if out of range
0019 304 :
0019 305 : The dispatch code has now been verified as being handled by this dispatcher,
0019 306 : now the argument list will be probed and the required number of arguments
0019 307 : verified.
0019 308 :
51 0000'CF41 9A 0019 309 MOVZBL W^EXEC_NARG[R1],R1 ; Get required argument count
51 00000004 9F41 DE 001F 310 MOVAL @#4[R1],R1 ; Compute byte count including arg count
BFEO'CF40 6C 91 002D 311 IFNORD R1,(AP),EACCVIO ; Branch if arglist not readable
D1 1F 0033 312 CMPB (AP),W^<EXEC_NARG-ECODE_BASE>[RO] ; Check for required number
5E 5D D0 0035 313 BLSSU EINSFARG ; of arguments
50 AF 0038 314 MOVL FP,SP ; remove JSB longwords from stack
003A 315 CASEW RO,- ; Case on change mode
003A 316 - ; argument value
003A 317 #ECODE_BASE,- ; Base value
0B 4020 8F 003A 318 #<EXEC_COUNTER-1> ; Limit value (number of entries)
003E 319 ECASE_BASE: ; Case table base address for DEFINE_SERVICE
003E 320 :
003E 321 : Case table entries are made in the PSECT USER_EXEC_DISP1 by
003E 322 : invocations of the DEFINE_SERVICE macro. The three PSECTS,
003E 323 : USER_EXEC_DISP0,1,2 will be abutted in lexical order at link-time.
00000000 324 :
0000 325 .PSECT USER_EXEC_DISP2,BYTE,NOWRT,EXE,PIC,SHR
0004 326 BUG_CHECK IVSSRVREQST,FATAL ; range validation performed above so
0004 327 ; should never reach here
```



```

0004 329      .SBTTL Rundown Handler
0004 330
0004 331      :++
0004 332      :
0004 333      : The rundown handler is called when image or process rundown is performed.
0004 334      : It cleans up context related to this package of services.
0004 335      :
0004 336      : Calling Sequence:
0004 337      :
0004 338      :     JSB RDB_RUNDOWN
0004 339      :
0004 340      : Inputs:
0004 341      :
0004 342      :     none
0004 343      :
0004 344      : --
0004 345
0004 346
0004 347 RDB_RUNDOWN:
0004 348     CALLS #0,RUNDOWN_CHANGE_ACL ; Do rundown for the $CHANGE_ACL service
000B 349     RSB
000C 350
000C 351
000C 352     .END
  
```

00000000'EF 00 FB 05

RDBDISP
Symbol table

- Rights database system service dispatch 16-SEP-1984 01:58:36 VAX/VMS Macro V04-00
5-SEP-1984 01:44:52 [LOADSS.SRC]RDBDISP.MAR;1

Page 9
(6)

BUGS_IVSSRVQST	*****	X	08
EACCVIO	00000000	R	07
ECASE_BASE	0000003E	R	07
ECODE_BASE	= 00004020		
EINSFARG	00000006	R	07
ENOTME	0000000C	R	07
EXEC_COUNTER	= 0000000C		
EXEC_DISPATCH	0000000D	RG	07
EXEC_NARG	00000000	R	03
KCODE_BASE	= 00000000		
KERNEL_COUNTER	= 00000000		
KERNEL_NARG	00000000	R	02
PLVSC_TYP_CM0D	= 00000001		
RDB_R0ND0WN	00000004	R	08
R0ND0WN_CHANGE_ACL	*****	X	08
SS\$ACCVIO	*****	X	07
SS\$INSFARG	*****	X	07
SYSSADD_H0LDER	*****	X	04
SYSSADD_IDENT	*****	X	04
SYSSCHANGE_ACL	*****	X	04
SYSSCREATE_RDB	*****	X	04
SYSSFIND_HELD	*****	X	04
SYSSFIND_H0LDER	*****	X	04
SYSSFORMAT_ACL	*****	X	04
SYSSK_VERSION	*****	X	06
SYSSMOD_H0LDER	*****	X	04
SYSSMOD_IDENT	*****	X	04
SYSSPARSE_ACL	*****	X	04
SYSSREM_H0LDER	*****	X	04
SYSSREM_IDENT	*****	X	04

+-----+
! Psect synopsis !
+-----+

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
\$ABSS	00000000 (0.)	01 (1.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
KERNEL_NARG	00000000 (0.)	02 (2.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE
EXEC_NARG	0000000C (12.)	03 (3.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE
\$\$\$TRANSFER_VECTOR	0000005F (95.)	04 (4.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC PAGE
USER_EXEC_DISP1	00000018 (24.)	05 (5.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE
USER_SERVICES	00000020 (32.)	06 (6.)	PIC USR CON REL LCL SHR EXE RD NOWRT VEC PAGE
USER_EXEC_DISPO	0000003E (62.)	07 (7.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE
USER_EXEC_DISP2	0000000C (12.)	08 (8.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE

+-----+
! Performance indicators !
+-----+

Phase	Page faults	CPU Time	Elapsed Time
Initialization	32	00:00:00.07	00:00:00.76
Command processing	133	00:00:00.68	00:00:04.62
Pass 1	150	00:00:02.62	00:00:08.05
Symbol table sort	0	00:00:00.12	00:00:00.12

Pass 2	83	00:00:00.95	00:00:02.41
Symbol table output	5	00:00:00.03	00:00:00.24
Psect synopsis output	3	00:00:00.05	00:00:00.10
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	408	00:00:04.54	00:00:16.39

The working set limit was 1200 pages.

11621 bytes (23 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 120 non-local and 0 local symbols.
352 source lines were read in Pass 1, producing 27 object records in Pass 2.
14 pages of virtual memory were used to define 11 macros.

-----+
! Macro library statistics !
-----+

Macro library name	Macros defined
-----	-----
-\$255\$DUA28:[SYS.OBJ]LIB.MLB;1	2
-\$255\$DUA28:[SYSLIB]STARLET.MLB;2	5
TOTALS (all libraries)	7

163 GETS were required to define 7 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS\$:RDBDISP/OBJ=OBJ\$:RDBDISP MSRC\$:RDBDISP/UPDATE=(ENH\$:RDBDISP)+EXECML\$/LIB

0220

AH-BT13A-SE
 VAX/VMS V4.0

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